North Shore
Children's Hospital

In Collaboration with MassGeneral Hospital for Children

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North Shore Children's Hospital
Neurodevelopmental Center
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Neuropsychological Assessment

Patient: Aaron Smith
DOB: 5/4/87
Age: 15-9
Dates of Testing: 01/31/03
Date of Report: 02/10/03
Examiner: Seth A. Doolin, MA
Supervised by: Robert Caggiano, Ed.D.

Procedures:
Clinical Interview
Wechsler Intelligence Scale for Children – Third Edition (WISC-III)
Rey-Osterrieth Complex Figure (ROCF)
Test of Language Competence (TLC; Listening Comprehension and Figurate Language)
Gates-MacGinitie Reading Test, Level 10/12 Form S
Wisconsin Card Sorting Test (WCST)
Conner's Continuous Performance Test – II (CPT-II)
Behavior Rating Inventory of Executive Function – Parent Form (BRIEF)
Delis-Kaplan Executive Function System (DKEFS), Verbal Fluency, Trails subtests
Wide Range Assessment of Memory and Learning (WRAML) select subtests
Wide Range Achievement Test, 3rd Edition (WRAT-3) Spelling subtest
Self Esteem Index (SEI)
Asperger Syndrome Diagnostic Scale
Boston Naming Test
Three Wishes
Rorschach
Thematic Apperception Test (TAT)
Roberts' Apperception Test (RAT)

Reason for Referral:

Arron Smith was referred to the North Shore Children's Hospital Neurodevelopmental Center by Larry Larsen, Ph.D., Aaron's therapist, and his primary care physician, Dr. Jan Schwarner. Dr. Larsen referred Aaron to the Neurodevelopmental Center in order to determine whether a right hemisphere brain dysfunction or nonverbal learning disability could help explain Aaron's presentation and recent difficulties in school and socially. Additionally, his parents have felt that Aaron has more potential than

is evidenced by his current grade point average and request assistance in intervention and school accommodations.

Identifying Information:

Aaron Smith is a right-handed Caucasian male aged fifteen years and nine months. He is the third of three children of an intact family. He lives with his mother, father, and older sister. His oldest brother is away at college. He is currently a sophomore at Reading Memorial High School. He has been diagnosed and medicated for an Attention Deficit Disorder since the 5th grade. Until roughly one year ago, Aaron was prescribed Ritalin. Currently he is taking Concerta, and both he and his parents report favorable results.

Relevant History:

The history in the section was provided by Aaron's mother, Stacey Smith, as well as by Aaron himself, and may be considered reliable. Additionally, Dr. Larsen, the referral source, was contacted for additional information pertaining to Aaron's cognitive and emotional functioning.

History of Presenting Illness:

Aaron was identified as having an Attention Deficit Disorder by his elementary school teachers in the fifth grade. According to his mother, both Aaron's older brother and older sister were diagnosed with an Attention Deficit Disorder prior to Aaron's diagnosis. His mother mentions that throughout Aaron's academic career, his teachers have noted that Aaron is regarded as a bright and intelligent child, yet issues of distractibility and discipline have been ongoing concerns.

There is a family history of depression. Aaron's maternal grandfather suffered with depression, culminating in a completed suicide. Additionally, Aaron's older brother, now 19 years old, is reported to be prescribed antidepressant medication.

Developmental History:

Stacey Smith reported her pregnancy with Aaron, her third pregnancy, to be "fine", although she did note that she had to be induced for all three of her children as she was always late. Aaron's birth weight was nine pounds, he reported sat upright, walked, and talked on schedule. As noted above, Aaron was identified by his fifth grade teachers as presenting with distractible and impulsive behavior, which resulted in his receiving treatment for Attention Deficit Disorder.

Medical History:

There are no significant findings in Aaron's medical history relevant to his cognitive or emotional functioning.

Family/Social History:

Aaron is the youngest of three children in an intact family. His mother, Stacey Smith, has completed a 2 year graduate degree in Nursing and works in a critical care unit. Family history of depression in maternal grandfather has been noted above. Aarons's father, William Smith, has completed a Bachelor's in nursing and is currently

employed in a research capacity. All siblings have been diagnosed and medicated for Attention Deficit Disorder. Additionally, his mother reported that Aaron's oldest brother has received psychological testing and was found to be intellectually gifted, yet is presently having difficulty while attending a state university.

Behavioral Observations:

Aaron presents as a tall (over 6 feet) young man, who, due to his size, presents as older than his actual fifteen years. His hair was cut short, he was dressed casually, although neatly, and appeared to evidence smooth coordination when walking down the hall. It was noticed that his eye contact was inconsistent, and that he would often look down or lower his head and hunch over, thus making his height diminish to a more average size. His speech was clear and articulate, volume and tone within normal limits, and he evidenced no difficulties in grasp in dominant (right) or non-dominant hand.

Aaron's spontaneous speech could best be described as conservative. While he would respond to anything asked by the examiner, he did not once raise a question or initiate conversation. He was, however, cooperative and engaged in the assessment process. He appeared to put forth an earnest effort, and therefore this testing may be assumed to be valid. Additionally, Aaron worked quickly through the testing items, yet it should be mentioned that his mother requested testing end before 4:00 as he had a basketball game at which he was the star player, according to his mother.

Test Results:

Results of the present testing suggest that Aaron's intellectual potential is in the superior range of ability, yet he displays mild executive functioning vulnerabilities, as well as a less well developed right hemisphere which may present difficulties in understanding part/whole activities, as well as in the interpersonal and social domains. These findings will be explored in full below.

General Intelligence:

Aaron's intellectual potential, as measured by the Wechsler Intelligence Scale for Children, 3rd Edition (WISC-III), is suggested to be well above average, especially on tasks of verbal reasoning. The subscale measures of verbal reasoning on the WISC-III were seen to be consistently higher than average with the exception of the Digit Span subtest. This relatively low score on Digit Span (although within normal limits for the general population, this score is low *relative* to Aaron's verbal strengths) suggests that his store of information for immediate encoding is not as well developed as the rest of his abilities. The implications of this will be discussed in the Learning and Memory section of this report.

Essentially, Aaron is a young man whose intellectual capabilities are out of balance. As with many gifted youngsters, the assets he posses in some areas of cognition outstrip other aspects of cognition, and his academic progress is then uneven, at times variable. The nonverbal scales on the WISC-III evidenced inconsistent nonverbal ability and overall suggest a less cohesively developed right hemisphere. It should be noted that although Aaron's scaled scores on the nonverbal section are all with normal limits, for the most part they do not cluster together in as uniform fashion as his verbal skills do. The result is that the nonverbal abilities that have to do with visual discrimination and

sheer speed in mental processing are much higher than average, although the abilities that have to do with putting parts together into wholes are closer to the average range.

The profile presented from the WISC-III data paints Aaron as a young man with exception verbal ability who is able to process and produce very quickly, although his difficulty moving from parts to wholes may impede his progress and frustrate him. Additionally, his speed coupled with difficulty moving from the part to the whole may appear as impulsive or perhaps the product of poor judgment.

Executive Functioning:

Executive functioning refers to a person's ability to create categories, organize thoughts and prioritize tasks, hold ideas or figures in "working memory", sustain effort. It also includes the ability to shift from one task to another without getting lost or confused, inhibit responses or impulses, and initiate a task. Essentially, when we speak of executive functions we speak of the part of the brain that organizes the rest of brain to the task at hand.

Among the tasks presented to measure various aspects of executive functioning were the Mazes and Digit Span sections of the WISC-III. On both subtests Aaron's scores were in the average range, although this contrasts with his above average scores in the majority of other measures. The executive function tasks of planning and inhibiting impulsive responses can be seen on the Mazes subtest, therefore a score in the average range may suggest that Aaron's abilities in these areas may be within normal limits, they may not be well-developed enough for the rest of Aaron's abilities. Additionally, the Digit Span subtest, while within normal limits, suggesting an average size store for information for immediate recall, may also not be adequate to keep up with Aaron's quick processing and innate verbal ability.

Other measures of executive function included the Wisconsin Card Sort Test, a task that requires an individual to problem solve nonverbally by deducing the rules of game using examiner feedback. Aaron was able to determine the necessary variables much faster and more efficiently than the average person his age. Aaron's speed was also noted on the Conner's Continuous Performance Test (CPT-II), where he was required to maintain vigilance and inhibit an impulse. His scores on this test were within normal limits, although his speed at response was noted to be atypically fast.

A test of visual scanning, sequencing, and shifting was presented to Aaron. On the first condition, the visual scanning, his score was seen to be below average. This may be attributed to warming up to the task or perhaps suggests difficulty in a self-directed search (as opposed to the visual discrimination Symbol Search task from the WISC-III in which Aaron's score was in the superior range). Subsequent tasks of number and letter sequencing, as well as switching and motor speed were seen to be within normal limits or higher.

A task of verbal fluency, the ability to produce words spontaneously, was seen to be easier for Aaron once he imposed a structure or strategy. When given a letter and asked to produce words beginning with that letter, his scores were within normal limits, although when given a category he was able to impose an alphabetical structure that helped him raise his score to an above average range. This suggests a mild vulnerability in executive functioning yet also suggests that Aaron would benefit from the use of structure and strategies for learning.

Finally, the Behavior Rating Inventory of Executive Function was administered to Aaron's mother. She endorsed as problematic Inhibition, Initiation, Working Memory, Planning and Organization, Organization of Materials, and Self-Monitoring. Although glimmers of these components were noted during testing, the endorsements on the BRIEF were not on the whole consistent with the present testing and more examination may be necessary.

Language and Reading:

On the Gates-MacGinite Reading Test, Aaron's scores for the Vocabulary and Comprehension subtests were both well above average (99th and 98th percentiles, respectively). Additionally, the Boston Naming Test, a test of confrontation naming, was within normal limits.

Subtests from the Test of Listening Comprehension were administered as nuances in language and comprehension would be consistent with nonverbal learning disorders as per the referral question. On the Listening Comprehension: Making Inferences subtest, which requires the individual to be able to "hear between the lines", Aaron's scores were above average, suggesting an adept ability at deducing language nuance, however, his scores on the Figurative Language subtest, which requires one to understanding language in context, while within normal limits, did not approach other scores in this area. Again it may be suggested that language in context, essential a part/whole activity, is not quite at the level of Aaron's innate verbal ability or his speed of processing.

Finally, the Wide Range Achievement Test (WRAT-3) Spelling subtest was administered. Aaron's score here was in the 63rd percentile, which, again while within normal limits, was not at his rate of accomplishment as in other areas.

Visual Motor:

As mentioned earlier in this report, while Aaron's visual discrimination appears to be above average, as evidenced by a high score on Symbol Search on the WISC-III. Measures of motor speed, however, are inconsistent. The WISC-III measure on Coding is well above average while the DKEFS measure of Motor Speed is closer to normal limits. Other aspects of visual motor and visual spatial ability as measured by the WISC-III indicate that these skills may be within normal limits, however the clustering of Object Assembly, Picture Arrangement, and Block Design, all in the average range, suggest that whether common everyday objects or abstract geometric designs, the task of assembling a whole out of parts or breaking down a whole into its constituent parts is a relative weakness for Aaron and may point to a less well-developed right hemisphere.

Learning and Memory:

The Wide Range Assessment of Memory and Learning (WRAML) was administered, and, as noted above, Aaron appeared to be able to encode and retain more information under conditions of structure. Additionally, it was noted that time to consolidate information may be a necessary factor in his individual learning style.

Despite Aaron's difficulty with hands-on part/whole tasks, he was able to do quite well in tasks of visual-practic (drawing and design) memory. On the he was presented with four novel designs and his score on intermediate recall was slightly above average.

Additionally, his work on the Rey-Osterrieth Complex Figure Test demonstrated an adequate ability to organize information, although some omissions were noted.

Tasks of Sentence Memory were also scored slightly above the average range, as was a Story Memory subtest which scored in the high average range. It is suggested that the structure of the sentence and narrative structure, respectively, of these tasks gave Aaron the structure he needed to assist his encoding of information.

As noted at the outset of the results section of this report, his WISC-III score on Digit Span suggest a relatively small store for immediate information, especially when compared to his exceptional ability in the verbal domain and his mental processing ability. This relatively small store for information was noted in the Finger Windows task, where Aaron was required to repeat visual spatial information presented. Also, the Verbal Learning subtest is significant for a sharp learning curve, suggesting that at the first of four trials Aaron was not able to "get too much information in", although repetition was helpful to him as with each trial he was able to encode more information. It was interesting to note that after a twenty to thirty minute delay, Aaron was able to recall more information than in the previous trials of immediate memory. This would suggest that time to consolidate information may be just as important to Aaron's learning as structure and repetition.

Emotional Functioing:

As Aaron's family history is significant for depression and as lack of social and interpersonal interest as reported by Aaron's parents were part of the referral question, personality inventories and projective tests became a necessary part of this assessment.

Projective testing is marked by distance, veiled introspection, and emotional constriction. This presents Aaron as a young man grappling with the developmentally appropriate tasks of adolescence (developing individual identity and separating from his parents) in a cognitive manner and having difficulty incorporating affect into his coping style. There were numerous instances of Aaron's backing off from affect and general discomfort with processing emotion.

Aaron also appears to have difficulty making sense of the subtleties of his environment, in effect, missing the trees while concerning himself with the forest. He seems to have the most difficulty with interpersonal situations, and his trouble in "reading" interpersonal cues may be seen in one RAT card in which he sees two boys as either "fighting or dancing", activities which have very different implications and very different emotional valences. This would indicate a difficulty in peer relations, which is something noted by Aaron's parents in his relative quiet and restrained social life.

While Aaron appears to have difficulty integrating emotion into his processing style, he also appears to seek attachment. One interesting response was that of people trying to warm themselves over a fire, which may speak to aspirations toward attachment with positive and nurturant figures in his life.

On the Self-Esteem Index (SEI) Aaron endorsed healthy self-esteem within normal limits in the domains of Perception of Familial Acceptance and Personal Security, although his endorsements of Academic Competence and Peer Popularity were relatively lower, marking these as potential areas of concern to him.

Issues of competence and acceptance were also noted in his TAT and RAT narratives, as were issues of basic emotional needs such as security and nurturance. He

appears to be grappling with developmentally appropriate issues of reliance on his parents and breaking away from them.

Asperger Syndrome Diagnostic Scale

The Asperger Syndrom Diagnostic Scale was administered as the referral question inquired as to the possibility of right hemispheric issues. The endorsements on this measure, completed by Aaron's mother, translated to a total score qualitatively interpreted as unlikely that Aaron demonstrates symptoms of Asperger Syndrome. Within the subscales, his mother made significant endorsements in the domains of Cognitive and Sensorimotor functioning, although many of these endorsements are more indicative of Aaron's intellectual ability. Further, although his eye contact was judged to be impersistent, Aaron did not demonstrate such formal criteria of Asperger Syndrome such as encyclopedic knowledge within a narrow subject range, inflexible adherence to nonfunctional routines or rituals, and no stereotyped or repetitive motor mannerisms, as per DSM IV. Therefore, a formal diagnosis of Asperger Syndrome would not be warranted by the present assessment.

Summary and Conclusions:

Aaron presents with exceptional intellectual potential in the realms of verbal ability and sheer mental processing, however, this innate verbal ability and quickness in processing may result in his "running ahead of himself" as the part/whole aspects of cognitive processing lag behind his speed and verbal skill. Additionally, suggestions of a less well-developed right hemisphere have implications for social and emotional functioning as the part/whole element of social interaction with the various nonverbal cues that comprise interaction and communication may be misread at best, and distorted at worst. Both the WISC-III and Rorschach evidence difficulty processing parts to whole and breaking down wholes to their constituent parts. Additionally, some TAT and RAT narratives appear to misread social context, which was also seen in tests of language comprehension.

Despite the overall gifted potential Aaron demonstrates, mild vulnerabilities in executive functioning were noted, yet also noted was Aaron's capacity to use structure and compensatory strategies.

Recommendations:

1. Aaron appears to benefit from structure and organizational strategies in learning situations to enhance his progress. As he is able to impose some structure on materials, with some guidance and reminders he could begin to use organizational strategies more consistently.
2. Repetition has been seen to serve Aaron well. He should be encouraged to study facts by verbal repetition as this has been seen to enhance his ability to store and retrieve information.
3. Aaron appears to require some time to process and consolidate information. His studying schedule should allow time for material to "sink in" prior to tests.
4. Due to less well developed right hemispheric issues, Aaron may experience difficulty in interpersonal interactions. He would thus benefit from social skills and social pragmatics training. This can be verbally mediated, for instance, in

therapy, or in groups especially designed to teach social pragmatics. Again, as repetition and consolidation appear to be the key to Aaron's learning, he will need a number of trials as well as time between training sessions or groups to allow the material to "sink in".

5. As Aaron may have difficulty "reading" interpersonal situations, and as his mind processes data quickly, this may lead to erroneous assumptions in interpersonal interactions. Encourage Aaron to check out his assumptions and perceptions verbally with others, and encourage him to ask clarifying questions to teachers as well as friends in social situations.
6. The integration of affect appears to be problematic for Aaron. Given a family history of depression and the developmental tasks of adolescence, Aaron mayu likely be experiencing a number of psychosocial, developmental, and biological/hormonal stressors. As his projective content raises many age-appropriate issues of identity and emerging independence from parental figures, more frequent therapy sessions may be helpful to assist him in integrating affect into his processing style as opposed to his defenses of distancing and undoing, as may be seen in various projective responses.
7. In selection of college learning environments, Aaron would benefit from smaller class sizes with focus on discussion groups. The smaller class sizes would be beneficial to Aaron due to mild difficulties with distraction and impulsive behavior. Further, discussion groups would be helpful in terms of repetition, as cited above, as well as offering Aaron the chance to check out his assumptions about interpersonal interactions.
8. Aaron could benefit from using class syllabi and a calendar to keep track of and anticipate exams and papers in order to allow adequate time for review and consolidation.

Thank you for referring this likeable youngster. If you have any questions, please feel free to call the Neurodevelopmental Center: (978) 354-2705.

Seth A. Doolin, MA
Psychology Intern

Robert Caggiano, Ed.D.
Supervising Neuropsychologist

Attachment: Data Set

Wechsler Intelligence Scale for Children – Third Edition (WISC-III)

Full Scale IQ: 127, 96th percentile
Verbal IQ: 134, 99th percentile
Performance IQ: 113, 81st percentile
Verbal Comprehension Index: 134, 99th percentile
Perceptual Organization Index: 105, 63rd percentile
Freedom from Distractibility Index: 115, 84th percentile
Processing Speed Index: 143, 99.8th percentile

Subtest	Scaled Score
Information	15
Similarities	16
Arithmetic	16
Vocabulary	16
Comprehension	16
Digit Span	9

Subtest	Scaled Score
Picture Completion	13
Coding	17
Picture Arrangement	10
Block Design	9
Symbol Search	19
Object Assembly	9
Mazes	10

Wide Range Achievement Test, Revision 3 (WRAT-3)

	Raw Score	Standard Score	Percentile	Grade Score
Spelling	41	105	63	HS

Gates-MacGinitie Reading Test, 4th Ed., Level 7/9

	Normal Curve Equivalent	Percentile	Grade Equivalent
Vocabulary	99	99	PHS
Comprehension	93	98	PHS
Total	99	99	PHS

Test of Language Competence – Expanded Edition (TLC-E)

	Raw Score	Scaled Score	Percentile Rank
Listening Comprehension	36	14	91
Figurative Language	28	10	50

Boston Naming Test

Raw Score	Mean for Age	Standard Deviation	Note
56	55 (est)	4.4 (est)	WNL

Stimulus cues given: 4
Correct with Stimulus cue: 2
Phonemic cues given: 1
Correct with Phonemic cue: 0
Literal Paraphasias: 2

Wisconsin Card Sorting Test (WCST)

Sorts: 6, >16th percentile
Failure to Maintain Set: 0, >16th percentile

	Raw Score	Percentile	Standard Score	Percent Error
Correct	63	N/A	N/A	N/A
Error	7	97	128	10

Perseveration	4	99	135	6
Perseverative Error	4	99	135	6
Non-Persev. Error	3	94	123	4

Conners' Continuous Performance Test II (CPT II)

T Score > 65 (critical)	T Score 60- 65 (mild)
None	None

Clinical Significance: 36.7%

Behavior Rating Inventory of Executive Function (BRIEF)

Scale	T Score
Inhibit	**69**
Shift	58
Emotional Control	58
Initiate	**83**
Working Memory	**82**
Plan/Organize	**72**
Org. Materials	**63**
Monitor	**71**
BRI	**63**
Metacognition Index	**77**
GEC	**74**

Critial scores (over 60) in bold

DKEFS – Verbal Fluency

Condition	Scaled Scored
Letter	11
Category	17
Switch	12
Switch Accuracy	7

Interval 1	17
Interval 2	11
Interval 3	5
Interval 4	4

DKEFS – Trails

Condition	Scaled Scored
Visual Scanning	6
Number Sequence	13
Letter Sequence	13
Switch Numb/Lett	13
Motor Speed	11

Wide Range Assessment of Memory And Learning (WRAML)

Design Memory

Raw Score	Scaled Score	Percentile	Qualification
45	13		Good

Verbal Learning

Raw Score	Scaled Score	List 1	List 2	List 3	List 4	Delayed
40	11	5	10	12	13	14

Story Memory

Raw Score	Scaled Score	Delayed Raw
33	12	30

Sentence Memory

Raw Score	Scaled Score	Percentile
28	13	

Finger Windows

Scaled Score	Scaled Score	Percentile
15	8	

Rey-Osterrieth Complex Figure (RQCF)

	Copy	Intermediate	Delay
Raw Score (of 36)	36	30	30

Note: Attention to detail

Self-Esteem Index

	Raw Score	Scaled Score	Percentile Rank
Total Test	229	9	35
Family Acceptance	59	9	37
Academic Competence	53	7	16
Peer Popularity	59	7	16
Security	58	9	37

Asperger Syndrome Diagnostic Scale

Subscale	**Raw Score**	**Standard Score**	**Percentile**
Language	3	3	1
Social	4	3	1
Maladaptive	3	5	5
Cognitive	8	11	63
Sensorimotor	2	7	16
Total	20	71	2

Clinical Significance: Unlikely

Key To Test Scores

Standard Scores are ways to compare an individual's performance across tests. Wechsler IQs have a mean of 100 and a standard deviation of 15. Two-thirds of all

individuals wil obtain a score between 85 and 115. Standard scores between 90 and 110 are often considered "average", though may be significantly below or above expectation for an individual, depending on other factors.

Scaled Scores are similar to standard scores, they have a mean of 10, with a standard deviation of 3.

T Scores are similar to standard scores. They have a mean of 50 and a standard deviation of 10.

Percentile Rank refers to the percent of peers around the United States that the test maker found to typically score below an individual's score. For example, a percentile score of 70 indicates that an individual performed better than 70 percent of peers taking that test.

Age equivalents indicate how an individual's performance compares to the average performance at this age level. Numbers separated by dashes are months: for example, "10-4" is read "typical of average children aged 10 years, four months".